TREND STUDY 1-3-96

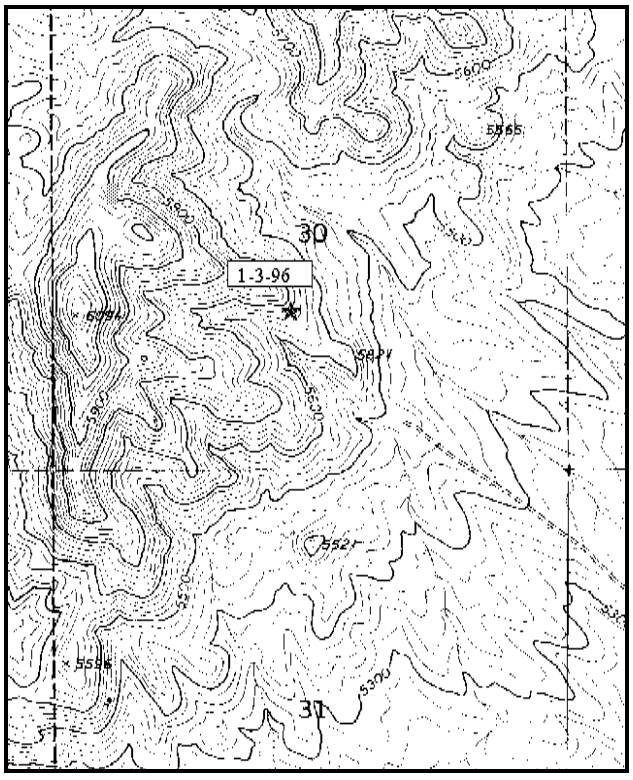
Study site name: Rosebud Hills . Range type: Sagebrush/grass .

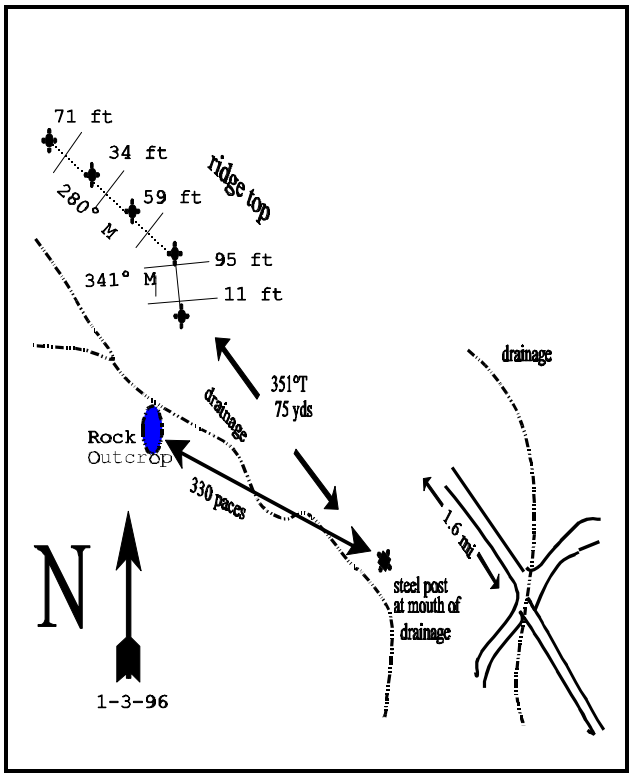
Compass bearing: frequency baseline 341 degrees.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) Line 1 (11 & 95ft), line 2 (59ft), line 3 (34 & 71ft).

LOCATION DESCRIPTION

Traveling towards Rosette (north) on U-30, proceed 0.1 miles past mile marker 34 and turn left (west). Note mileage here. Proceed through gate, travel 1.1 miles to a fork, turn left and proceed 0.25 miles southwest to another fork. Turn right and proceed 1.6 miles to end of the road, crossing a wash and following the ridgetop. From here walk to the mouth of the drainage to the left, start up drainage and find a green steel stake near opening of drainage. Beginning at the stake, proceed approximately 330 paces up the drainage bottom and note a large rock outcrop on the left. If the drainage has divided, you have gone too far. From the rock, take a bearing of 351 degrees true and proceed 75 yards up slope to the 0-foot stake of the baseline. The 0-foot stake is marked with browse tag number 7907. The baseline runs south to north at 341 degrees magnetic. Lines two and three change directions and run 280° M.





Map Name: Warm Springs Hill, Utah Diagrammatic Sketch

Township 11N , Range 15W , Section 30 , UTM COOR: 2-82-502E 46-13-826N

DISCUSSION

Trend Study No. 1-3

This study, located on the east side of the Rosebud Hills, is a major concentration area for wintering deer. Evidence for this conclusion was furnished by the presence of 12 winter-killed carcasses located within a 200 yard radius of the study site during the 1984 readings. Pellet groups are abundant, but appear to be quickly dispersed by overland water flow. This area is typical foothill terrain, occupied primarily by black sagebrush, with scattered pockets of Utah juniper on the ridges and canyon bottoms. Vegetative production for this vegetative type (black sagebrush-grass) was inventoried in 1970 and found to have an air dry weight of 1,194 pounds per acre. The study site has a moderately steep (40%) south slope and an elevation of 5,720 feet.

Soils on the study site, and on most of the surrounding area, are extremely rocky. Average rooting depth was estimated at 16.7 inches during the 1996 reading. The underlying rock appeared to be fractured in some areas as some deeper measurements were encountered over 20 inches. Weathered-in-place, soil is derived from parent material composed primarily of metamorphic rock, probably quartzite, and lesser amounts of a sedimentary shale-like rock. Ground cover from vegetation or litter is poor and erosion is occurring. Signs of erosion include the amount of exposed rock, erosion pavement and pedestalling of perennial plants. The soil surface has an almost "armored" appearance with rock and pavement covering more than half of the ground surface (61%).

Browse composition is dominated by an evenly spaced, but low-growing stand of black sagebrush numbering approximately 7,320 plants/acre in 1996. Of these, 12% are young, 70% are mature, and 18% are decadent. Individual shrubs are regularly spaced and separated by interspaces largely devoid of vegetation. Use was very heavy in 1984, when 95% of the mature and decadent sagebrush were classified as heavily hedged (>60% of twigs browsed). Percent decadence was also high then at 47%. Conditions were similar in 1990, except use was mostly light. Seedlings and young were numerous at 1,000 and 1,700 plants/acre respectively. By 1996, estimated population density increased to 7,320 plants/acre. Percent decadency dropped to 18% and use was heavy on only 14% of the mature and decadent shrubs. The black sagebrush population appears self-sustaining in spite of heavy use.

Other shrubs occurring on the study area include shadscale, narrowleaf low rabbitbrush, Nevada ephedra, spiny horsebrush, grey horsebrush, spiny hopsage, Utah juniper, a few antelope bitterbrush and big sagebrush that are intermediate in appearance between basin and Wyoming big sagebrush. The latter two species, however, are very heavily utilized and could likely disappear through time. Shadscale increased significantly in density since 1990 when 1,066 plants/acre were estimated. Currently there are 5,560 plants/acre, 31% of which are young plants. Some of the increase in population density may be due to the larger, more representative sample used in 1996, which better estimates aggregated or discontinuous populations. Utilization is moderate with heavy use reported on 18% of the mature plants.

Herbaceous composition is depleted and is of little value either for forage or soil protection. Grasses combine to produce only 1.5% cover, while forbs combine for less than one percent cover. Perennial or biennial plants are scarce and are limited to a few low-growing milkvetches, cryptantha, longleaf phlox, and grasses such as bottlebrush squirreltail, Indian ricegrass, Sandberg bluegrass, and sparse clumps of bearded bluebunch wheatgrass in the canyon bottom.

1984 APPARENT TREND ASSESSMENT

Soil is very shallow and rocky. A long history of erosion has removed much of

the surface soil leaving an almost "armored" soil surface composed of small to medium sized rocks and erosion pavement. Trend continues to decline but most of the damage has already occurred. Vegetative condition is poor but essentially stable with respect to trend. The herbaceous component is depleted and unlikely to improve or deteriorate further. The black sagebrush population is maintaining itself through seedling reproduction. Seedlings become established in shelter provided either by larger rocks or directly underneath shrub crowns.

1990 TREND ASSESSMENT

The lightly utilized south-facing slope is dominated by black sagebrush and shadscale. Both browse have increasing nested frequency and quadrat frequency values but the populations show little change from 1984. There is almost a 20% canopy cover from the low-growing sagebrush. The site supports very low diversity and production for perennial herbaceous plants. Grass sum of nested frequency and quadrat frequency indicates a slight overall decline. Forbs are already at very low frequencies (almost non-existent) with not much change. The high percentage of erosion pavement and active sheet erosion is normal for the type.

TREND ASSESSMENT
soil - stable, but poor condition
browse - stable
herbaceous understory - declining and poor condition

1996 TREND ASSESSMENT

Ground cover characteristics are similar to those of 1990. Soil conditions are poor but little bare soil is exposed. Soil depth estimates made in 1996 report effective rooting depth to be approximately 16.7 inches with occasional measurements over 20 inches. Soil temperature at an average depth of 15 inches is moderately high at 64°F, making this slope a harsh site with more than 60% rock cover and moderately high soil surface temperatures during the summer months. This helps explain why this area is dominated by black sagebrush instead of mountain big sagebrush. The browse trend is up with increased densities of black sagebrush and shadscale. Current utilization is heavier on these shrubs than in 1990, but not close to that of 1984. Percent decadence is lower and vigor is good. The herbaceous understory is still deficient. Trend is slightly up, due to an increase in the sum of nested frequency of grasses and forbs.

TREND ASSESSMENT
soil - stable but in poor condition with more than 60% rock cover
browse - up
herbaceous understory - up slightly but in poor condition, contributes to less than 3% total cover

HERBACEOUS TRENDS --
Herd unit 01 , Study no: 3

Type	Species	Nested Frequency '84	'90	'96	Quadrat Frequency '84	'90	'96	Average Cover % '96
G	Bromus tectorum (a)	-	-	119	-	-	48	.61
G	Oryzopsis hymenoides	23	31	30	14	16	17	.42
G	Sitanion hystrix	[a]68	[b]17	[c]40	33	7	22	.42
Total for Grasses		91	48	189	47	23	87	1.47

Type	Species	Nested Frequency '84	'90	'96	Quadrat Frequency '84	'90	'96	Average Cover % '96
F	Astragalus beckwithii	2	-	-	1	-	-	-
F	Astragalus newberryi	1	1	5	1	1	2	.01
F	Castilleja linariaefolia	-	-	7	-	-	3	.18
F	Cryptantha spp.	$_{a}$-	$_{a}$1	$_{b}$20	-	1	9	.10
F	Eriogonum cernuum (a)	-	-	50	-	-	22	.38
F	Gilia spp. (a)	-	-	8	-	-	3	.01
F	Lappula occidentalis (a)	-	-	4	-	-	2	.01
F	Oenothera spp.	$_{a}$-	$_{a}$-	$_{b}$12	-	-	6	.22
F	Phlox longifolia	-	-	6	-	-	2	.03
F	Sphaeralcea coccinea	-	-	1	-	-	1	.00
F	Unknown forb-perennial	-	-	4	-	-	2	.01
Total for Forbs		3	2	117	2	2	52	0.98

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 01 , Study no: 3

Type	Species	Strip Frequency ‘96	Average Cover % ‘96
B	Artemisia nova	98	14.77
B	Artemisia spinescens	1	-
B	Atriplex confertifolia	64	2.24
B	Chrysothamnus viscidiflorus stenophyllus	33	.86
B	Ephedra nevadensis	6	.06
B	Juniperus osteosperma	3	.44
B	Kochia americana	3	
B	Tetradymia nuttallii	4	.03
Total for Browse		212	18.40

BASIC COVER --
Herd unit 01 , Study no: 3

Cover Type	Nested Frequency '96	Average Cover % '84	'90	'96
Vegetation	256	1.25	4.50	20.42
Rock	370	43.00	54.75	45.49
Pavement	349	14.00	19.25	15.93
Litter	361	19.25	13.75	15.79
Cryptogams	81	.50	0	.43
Bare Ground	205	22.00	7.75	3.59

SOIL ANALYSIS DATA --
Herd Unit 01, Study no: 3

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
16.7	64.0 (14.9)	7.8	50.6	26.1	23.4	.81	5.4	208.0	.64

PELLET GROUP FREQUENCY --
Herd unit 01 , Study no: 3

Type	Quadrat Frequency '96
Rabbit	13
Deer	30

BROWSE CHARACTERISTICS --
Herd unit 01 , Study no: 3

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	84	47	2	-	-	-	-	-	-	-	49	-	-	-	1633			49
	90	30	-	-	-	-	-	-	-	-	30	-	-	-	1000			30
	96	24	-	-	2	-	-	-	-	-	26	-	-	-	520			26
Y	84	5	2	-	-	-	-	-	-	-	7	-	-	-	233			7
	90	49	2	-	-	-	-	-	-	-	49	1	1	-	1700			51
	96	24	15	2	1	1	-	-	-	-	43	-	-	-	860			43
M	84	-	3	85	-	-	-	-	-	-	69	-	19	-	2933	14	23	88
	90	62	-	-	-	-	-	-	-	-	62	-	-	-	2066	9	18	62
	96	8	99	40	-	107	3	-	-	-	252	-	5	-	5140	10	24	257
D	84	-	6	79	-	-	-	-	-	-	58	-	27	-	2833			85
	90	75	2	1	1	-	-	-	-	-	65	2	7	5	2633			79
	96	2	42	6	-	14	2	-	-	-	55	-	-	11	1320			66
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	740			37
Total Plants/Acre (excluding Dead & Seedlings)													'84		5999	Dec:		47%
													'90		6399			41%
													'96		7320			18%
Artemisia spinescens																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	3	-	-	-	-	-	-	-	3	-	-	-	60	3	4	3
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		60			-
Atriplex confertifolia																		
S	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	2	-	-	1	-	-	-	-	-	3	-	-	-	100			3
	96	17	-	-	-	-	-	-	-	-	17	-	-	-	340			17
Y	84	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	90	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	96	35	26	4	4	17	1	-	-	-	87	-	-	-	1740			87
M	84	21	2	1	-	-	-	-	-	-	24	-	-	-	800	8	13	24
	90	13	-	-	-	-	-	-	-	-	13	-	-	-	433	8	9	13
	96	14	21	9	26	76	28	-	-	6	180	-	-	-	3600	6	12	180
D	84	10	2	1	-	-	-	-	-	-	12	-	1	-	433			13
	90	16	-	-	-	-	-	-	-	-	10	-	1	5	533			16
	96	1	-	-	1	8	1	-	-	-	8	-	-	3	220			11
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	160			8
Total Plants/Acre (excluding Dead & Seedlings)													'84		1366	Dec:		32%
													'90		1066			50%
													'96		5560			4%

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Chrysothamnus viscidiflorus stenophyllus																		
S	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	96	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
Y	84	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	90	7	-	-	1	-	-	-	-	-	8	-	-	-	266			8
	96	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
M	84	8	2	2	-	-	-	-	-	-	12	-	-	-	400	6	8	12
	90	10	-	-	-	-	-	-	-	-	10	-	-	-	333	8	11	10
	96	36	-	-	3	3	-	-	-	-	42	-	-	-	840	8	15	42
D	84	1	1	-	-	-	-	-	-	-	2	-	-	-	66			2
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)													'84		632	Dec:		10%
													'90		599			0%
													'96		940			0%
Ephedra nevadensis																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	2	-	1	-	-	-	-	2	-	1	-	100	10	13	3
	90	-	-	1	1	-	-	-	-	-	2	-	-	-	66	11	14	2
	96	-	-	3	-	1	3	-	-	-	7	-	-	-	140	11	16	7
Total Plants/Acre (excluding Dead & Seedlings)													'84		100	Dec:		-
													'90		99			-
													'96		140			-
Juniperus osteosperma																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	1	-	-	-	-	1	-	-	2	-	-	-	66	60	66	2
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33	67	87	1
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
Total Plants/Acre (excluding Dead & Seedlings)													'84		66	Dec:		-
													'90		66			-
													'96		60			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Kochia americana																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	4	-	-	1	-	-	-	-	-	5	-	-	-	100	6	5	5
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		120			-
Tetradymia nuttallii																		
S	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	6	-	-	-	-	-	-	-	-	6	-	-	-	200			6
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	10	-	-	-	-	-	-	-	-	10	-	-	-	333			10
	90	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	2	-	-	-	-	-	-	-	-	2	-	-	-	66	5	2	2
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	2	1	-	-	-	-	3	-	-	-	60	20	29	3
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)													'84		399	Dec:		0%
													'90		100			0%
													'96		80			25%
Tetradymia spinosa																		
M	84	1	-	-	-	-	-	-	-	-	1	-	-	-	33	15	19	1
	90	1	-	-	-	-	-	-	-	-	-	-	1	-	33	14	24	1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
Total Plants/Acre (excluding Dead & Seedlings)													'84		33	Dec:		-
													'90		33			-
													'96		0			-